

d. Remarks	

Correction to Previous Response

Applicants correct a typographical error in the previous response, which was mailed June 6, 2003. Page 7, lines 8 – 10, of that response should have stated:

5 With respect to independent claim 5, the Office Action states "[a]s to claim 5, Tearney does not disclose an integral outer optical cladding layer for the GRIN fiber-size lens (see Figure 7B)". O.A. page 5 3, lines 1-2.

Underlining and strikethroughs show the corrections to the previous response.

10 Rejections under 35 U.S.C. 103

1. The Office Action rejects claims 5 as obvious over a combination of U.S. Patent 6,134,003 of Tearney et al (Herein “Tearney”.) and U.S. Patent 5,881,195 (Herein “Walker”).).

The obvious rejection is moot, because amended claim 5 depends on allowed
15 claim 1.

2. The Office Action rejects claims 14 as obvious over a combination of Tearney and U.S. Patent 6,445,939 (Herein “Swanson”).

a. Swanson teaches away from amended claim 14

20 Swanson teaches away from a “GRIN fiber-size lens fused to an end of a fiber with a core and cladding” for the large focal lengths recited in amended claim 14. Instead of fusing the GRIN lens to the end of such a fiber, Swanson teaches spacing the GRIN lens away from the end of such a fiber to obtain a large focal length. In particular, Swanson states:

25 In order to achieve the working distances and optical parameters shown in FIG. 1, the lens 2 typically cannot be directly affixed to the single-mode fiber 1 because it is necessary that an optical beam transmitted through the optical fiber 1 first expand to the required beam diameter prior to being focused by the lens 2.

Swanson col. 5, lines 26 – 31 (underlining added).

30 Thus, Swanson teaches that a lens should not be directly fused to a single-mode fiber (SMF), i.e., a fiber with a core and cladding, because fixing the lens to such a fiber does not enable the optical beam to expand. Swanson states that such beam expansion is needed to get the "working distances" of Figure 1, i.e., focal lengths > 1 mm. Indeed,

Figure 2E shows a fiber 8 interposed between the gradient index lens and SMF 1, and the interposed fiber 8 is a “coreless fiber”. Swanson, col. 5, lines 31 – 33. Thus, Figure 2E and col. 5, lines 26 –33 teach that a GRIN lens should NOT be fused to a fiber having core and cladding if a large focal length is desired.

5 Since Swanson teaches away from “fusing a GRIN lens to an end of a fiber with a core and cladding” for the focal length recited in claim 14, it would be improper to reject amended claim 14 as being obviousness over a combination of references that includes Swanson. For this reason, the obviousness rejection of claim 14 should be withdrawn.

b. Combining Swanson with Tearney would not suggest amended claim 14

10 Even if Swanson suggests micro-lenses with focal lengths > 1 mm, at col. 2, lines 27 - 31, combining Swanson with Tearney would suggest a different apparatus than that of amended claim 14.

 In particular, the same paragraph at col. 2 of Swanson provides, as embodiments of such micro-lenses, combination devices in which a GRIN fiber is spliced to a coreless fiber. At col. 2, lines 26 – 37, Swanson suggests that the combination devices rather than the bare micro-GRIN lenses have focal lengths greater than 1 mm. Such combination devices are also shown in Figures 2A - 2E where micro-lenses connect to coreless fiber 8 rather than directly to SMF 1. Thus, even if Swanson suggests fiber-size lenses with focal lengths greater than 1 mm, the fiber-size lenses are combination devices where a lens is fused to a segment of coreless fiber rather than a bare GRIN lens as recited in the last line of claim 14.

 Also, at col. 5, lines 26 –31, Swanson states that a micro-lens must not be directly fixed to an SMF to achieve the working distances of Fig. 1, i.e., focal lengths somewhat greater than 1 mm. Instead, Swanson states that the beam from the SMF must expand, e.g., in a coreless fiber, prior to entering the lens. In light of this teaching, even if Swanson did motivate a GRIN lens with a focal length > 1 mm, Swanson does NOT motivate fusing said GRIN lens to the end of a fiber with a core and cladding as recited in amended claim 14.

 Also, the Office Action provides no suggestion that Tearney provides suggestions related to producing an apparatus with a focal length greater than 1 mm as recited in amended claim 14.

Thus, as a whole Swanson and Tearney would motivate interposing a coreless fiber between the GRIN lens and the fiber with a core and cladding when the focal length is greater than 1 mm as in amended claim 14. Since amended claim 14 does not allow such an interposed coreless fiber, combining Swanson and Tearney would, at most,
5 suggest an apparatus not described by amended claim 14.

C. Dependent Claims 15 -18

Dependent claims 15 – 18 are, at least, non-obvious by their dependence on non-obvious base claim 14.

10 Conclusion

For the above reasons, Applicants respectfully request allowance of claims 1-2 and 4-18 as presently pending.

No fee is believed due.

In the event of any non-payment or improper payment of a required fee, the
15 Commissioner is authorized to charge or to credit **Lucent Technologies Deposit Account No. 12-2325** to correct the error.

Respectfully,

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John F. McCabe, Reg. No. 42,854
Telephone: 908-582-6866

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Lucent Technologies Inc.
25 Docket Administrator, Rm. 3J-219
101 Crawfords Corner Road
Holmdel, New Jersey 07733